

**Watersheds:** Pit River

**Sampling**

**Period:** October 2003 – September 2005

**Project**

- Objectives:**
1. Document existing conditions of water quality and stream channel condition (including aquatic biota and aquatic/riparian habitat);
  2. Determine if and to what extent, beneficial water uses are impaired
  3. Establish a long-term, trend monitoring program to document ongoing and future watershed condition improvements, resulting from the cumulative implementation of improved management practices, restoration projects, and community education

#### KEY STATISTICS

Size of Pit River Watershed	4,300 sq mi
Number of sites Sampled	45
Number of Constituents measured	11
Grab Samples Taken	~4900
Continuous Monitoring	Flow Temperature Dissolved Oxygen

#### MESSAGE:

Expanded water quality and channel condition monitoring on major Pit River tributaries provided a baseline to measure future changes in overall condition and identified that water temperatures through the balance of the year is generally supportive of cold water species, average DO concentrations over a 24 or 48 hour period at selected sites were lower than the Regional Board Basin Plan objective, and nitrate nitrogen levels were below detectable limits during the summer growth season.

#### Site Locations:

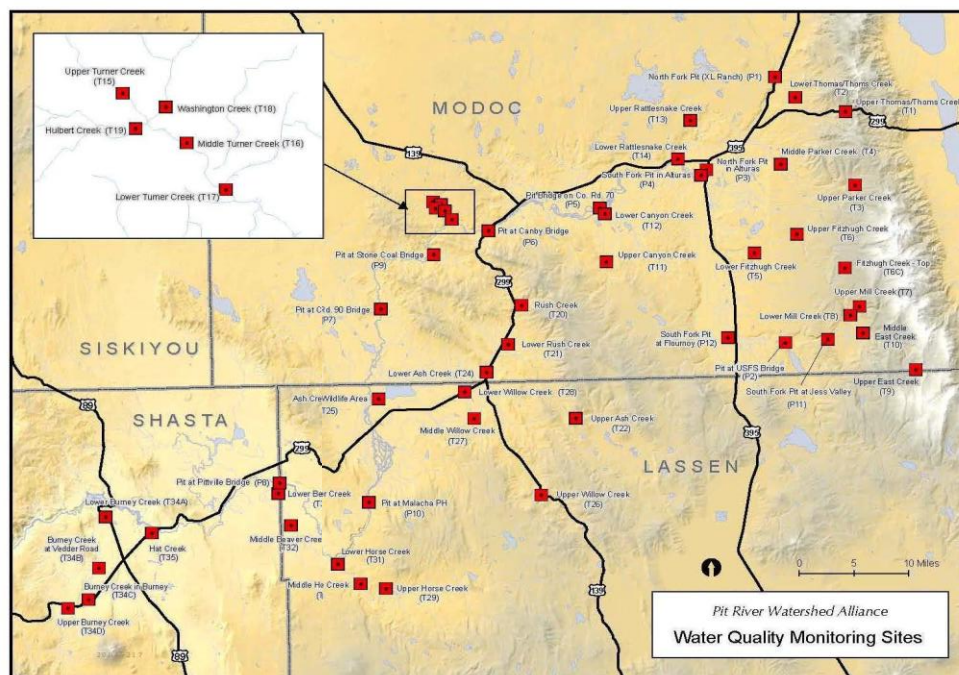


Table 1: Summary of Potential Beneficial Use Concerns: Pit River Watershed (September 2003 – September 2005)

Beneficial Use/Indicator	Pit River Tributaries																Pit River		
	North/ South Fork Basin						Warm Springs Basin		Stone Coal Valley Basin	Big Valley Basin			Fall River Valley		Hat Creek and Burney Creek Drainage		North Fork	South Fork	Pit
	Thomas Creek	Thoms Creek	Parker Creek	Fitzhugh Creek	Mill Creek	East Creek	Canyon Creek	Rattlesnake Creek	Turner Creek	Rush Creek	Ash Creek	Willow Creek	Horse Creek	Beaver Creek	Hat Creek	Burney Creek			
<b>Drinking Water</b>																			
Specific Conductivity (900 umhos/cm, CA Dept of Public Health)																			
<i>E. coli</i> (PA)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Aquatic Life</b>						*				*	*	*					*	*	*
pH (6.5 - 8.5, Basin Plan)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Temperature (75-F Max Weekly Average Temp, EPA)	S	S	S/NS	M/S	S	S	NS	NS	NS/M	S/NS/M	M	N S		M		S	S/M	M	
Dissolved Oxygen (7.0 mg/l, Basin Plan)							D				D	D					D		D
<b>Irrigation Water Supply</b>																		*	
Specific Conductivity (700 umhos/cm, Food & Ag Org. of United Nations)																			
<b>Recreation (Swimming)</b>		*					*				*	*							
<i>E. coli</i> (<235 MPN/100ml, USEPA Recreation Guideline for Designated Swimming areas)	X		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X

\*= 303(d) listed

X = One or more results above a goal or objective

D = Average of results from a 24 or 48 hour time period at the Pit River sites and selected tributaries in July 2005

M = Marginally Supportive A = Substantially above tolerance levels S = Supportive NS = Not Supportive

(Note: Creeks may have multiple listings, representing portions of the creek)

**WHAT IS THE MEASURE SHOWING?**

The data gathered over a 24 month period provides information on water quality from September 2003 – September 2005 and preliminary indications on the potential beneficial use impacts on the Pit River watershed.

Summer temperatures in the Pit River showed little variation between sites but, generally, would be too warm to support cold water species. For most tributary streams, only water temperatures in the upper elevation were at levels supportive of trout and other cold water species. Dissolved oxygen measured at selected sites during July and August 2005 over either a 24 or 48 hour period showed that both Pit River and tributary DO concentrations were lower than the Regional Board Basin Plan objective for DO. Specific conductance values for the Pit River and tributaries varied by season, but were all relatively low and within a range suitable for all beneficial uses. The pH of the Pit River and tributaries ranged seasonally from 7.5 to 9, which, while slightly above the Basin Plan objective for pH, appeared to be a normal pH for northeast CA waters and is not believed to limit beneficial water use. Turbidity and TSS in the Pit River were typically higher than in tributary streams, with the exception of Rattlesnake Cr which

consistently had high turbidity and high TSS. Turbidity and/or TSS appeared to reduce the EPT and taxonomic richness at tributary stations, most notably at Ash Creek, Rattlesnake Creek and Willow Creek. All sampled tributary streams had a fair or desirable EPT index and taxonomic richness for macroinvertebrates except Willow Creek Sites and Ash Creek. Nutrient monitoring included total phosphorus and nitrate nitrogen. While total P was relatively high, especially in the summer months, in the mainstem Pit River as compared to P levels in the tributary streams and other northstate rivers and streams, nitrate nitrogen was often below reporting limits, especially during the spring and summer months. *E. Coli* levels in both Pit River and tributaries were frequently in exceedance of the recommended EPA water quality criteria standard for protection of designated beaches (235 MPN/100ml). There were no obvious trends, site or seasonal, in the TOC data.

#### **WHY THIS INFORMATION IS IMPORTANT?**

The Pit River Watershed supports multiple beneficial uses (e.g. Contact Recreation, Aquatic Life, Drinking Water, Irrigation Water Supply) and at the time the report was written was 303(d) listed for high temperature, high nutrient loading, and low dissolved oxygen. Data collected as part of this watershed monitoring program provided baseline information in order to measure changes in the system as management practices change and was also used by the Pit River Water Coalition to fulfill monitoring requirements for the Regional Board's Conditional Waiver of Waste Discharge for Discharges from Irrigated Lands (the Ag Waiver Program). The data collected was directly utilized by the Pit River Watershed Alliance (PWA), a collaborative group of agencies, landowners, interest groups, and other stakeholders, that was formed to enhance water quality and aquatic habitat and coordinate management activities in the Pit River watershed. Goals of the PWA include restoration, protection, and enhancement of water quality and aquatic habitat (including watershed condition monitoring).

#### **WHAT FACTORS INFLUENCE THE MEASURE?**

Factors such as land use and hydrology can have significant effects on surface water quality. While these factors were not discussed in this report, information can be found in the Upper Pit River Watershed Assessment at

[http://www.pitriverralliance.net/pitrwd/library/pdfs/UPPER\\_PIT\\_RIVER\\_WATERSHED\\_ASSESSMENT\\_TextOnly.pdf](http://www.pitriverralliance.net/pitrwd/library/pdfs/UPPER_PIT_RIVER_WATERSHED_ASSESSMENT_TextOnly.pdf).

**Water Year (WY) Type:** Although not discussed in the report, water years 2003 and 2005 were classified as "Above Normal", while 2004 was classified as "Below Normal", based on the California Department of Water Resources Snow Surveys as applied to criteria in the Basin Plan. A summary of historic water year types is located at <http://cdec.water.ca.gov/cgi-progs/iodir/wsihist>.

**Flow:** Pit River flows varied seasonally and between years, influenced principally by annual precipitation and water storage/diversion operations. Average monthly flows across all tributary sites were highest in February and March and lowest in August and September.

#### **TECHNICAL CONSIDERATIONS:**

- *E. coli* is only an indicator of potential pathogens and does not necessarily identify an immediate health concern.
- Bioassessment is an indicator of aquatic community health but is not currently utilized as an independent regulatory tool
- Data includes ten sites that are not identified by site name. It is unknown if data from these sites were included in the Results and Discussion section of the report.
- Samples appear to be collected by the Pit River Watershed Alliance and stakeholders. Basic Laboratory in Redding, California, conducted all laboratory analyses.
- References:
  - Central Valley Regional Water Quality Control Board (CVRWQCB). 2007. Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins, Fourth Edition, August 2006.
  - Public report and fact sheet are available at: [http://www.waterboards.ca.gov/centralvalley/water\\_issues/water\\_quality\\_studies/surface\\_waterambient\\_monitoring/swamp\\_water\\_quality\\_reports/swamp\\_report\\_summary\\_sheet/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_studies/surface_waterambient_monitoring/swamp_water_quality_reports/swamp_report_summary_sheet/index.shtml)
  - Vestra for Pit River Watershed Alliance. 2004. Upper Pit River Watershed Assessment. [http://www.pitriverralliance.net/pitrwd/library/pdfs/UPPER\\_PIT\\_RIVER\\_WATERSHED\\_ASSESSMENT\\_TextOnly.pdf](http://www.pitriverralliance.net/pitrwd/library/pdfs/UPPER_PIT_RIVER_WATERSHED_ASSESSMENT_TextOnly.pdf)
  - USGS Historic Flow Data, USGS 11348500 Pit River Near Canby. <http://waterdata.usgs.gov/nwis/monthly>